ANNUAL REPORT

WEST VIRGINIA DEPARTMENT OF AGRICULTURE

PLANT PEST CONTROL DIVISION

JULY 1, 1986 - JUNE 30, 1987

The Plant Pest Control Division has the responsibility of carrying out the provisions of certain agricultural laws and enforcing the rules and regulations that have been promulgated from these laws. These include the following: (1) The Plant Pest Act of 1967, as amended 1972, which provides for agricultural plant pest survey and control and forest insect and disease survey and control, including the detection of possible newly introduced, or exotic, pests, biological control programs for insects and plant diseases, general insect and plant disease identification, and nursery inspection and registration; (2) The West Virginia Apiary Law of 1969, as amended 1981, which provides for apiary inspection, bee disease control and information which will promote beekeeping in West Virginia; (3) The West Virginia Noxious Weed Act of 1976, as amended 1981, which provides for surveillance, suppression and control of noxious weeds; (4) The Pesticide Act of 1961, The Pesticide Use and Application Act of 1975 and regulations established in 1982, which provide for certification of pesticide applicators, licensing of businesses applying pesticides for hire and pesticide product registration; (5) The Black Stem Rust Quarantine of 1967, which provides for wheat stem rust disease control through barberry (Berberis spp.) survey and eradication; and (6) The White Pine Blister Rust Quarantine of 1967, which provides for white pine blister rust control through currant and gooseberry (Ribes spp) survey and eradication. In carrying out this legislation, the Division cooperates with Federal, state and local government agencies. Specific, annually renewed, cooperative agreements exist with the U. S. Forest Service (USFS), the U. S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) and the U. S. Environmental Protection Agency (EPA).

The main offices and laboratories of the Division are located at the Guthrie Agricultural Center. Field offices are located in Union, Pipestem, Inwood and Morgantown and a number of field personnel are headquartered out of their homes in various parts of the state. These latter locations include: Berkeley Springs, Keyser, Capon Bridge, Franklin, Shady Spring, Huntington, New Martinsville and Ripley.

The Division was brought to full staff strength with the filling of its two vacant positions in the second quarter. Stephen A. Conlon was hired in November to full the vacant apiary inspector position and Meruia F. C. Yu was hired in December for the pesticide residue chemist position.

This full-strength situation was short-lived, however, as Clerk II Brenda Larzo transferred to a vacancy in the Fiscal Division on January 2. Rural Resources Division part-time employee J. Celestine Ervin was selected and eventually transferred to fill this vacancy.

Unfortunately, this did not end the personnel problems for the Division. The State's fiscal condition and the resulting FY-88 budget cuts hit the Department and this Division hard. A total of seven full-time positions were lost through layoffs at the end of the fiscal year, two in the Pesticide Use and Application Program and five in the Forest Pest Action Program, three of which were the only full-time field personnel in the Gypsy Moth Program. In addition, two full-time positions (one forest pest action and one apiary) will be lost in the first half of FY-88 through retirements that cannot be refilled, a third full-time (pesticide use and application) was lost through a resignation that could not be refilled and three part-time gypsy moth field personnel were lost through layoffs.

Along with the budget cuts and layoffs, there was an extensive reorganization within the Department at the end of the year. In the process, the Division lost the Pesticide Use and Application Program and the agricultural plant pathologist was transferred to another area and promoted, leaving a vacancy to fill.

In the Gypsy Moth Program, the budget cuts not only eliminated the field personnel, all of the current expense money was lost too. This means that, unless field personnel can be put back on soon, conditions improve and a supplemental appropriation can be obtained from the Legislature early in 1988, there will be no gypsy moth suppression operation next spring.

In spite of all these negatives, there were many positives during the year. Significant among these were:

The installation of new microscope equipment in the Pest Pest Identification Lab;

The continued progress on Division computerization;

The acquisition of a more advanced copier that significantly increased our efficiency in duplicating and manipulating paper documents;

The progress made on establishing Enforcement Procedures and Wood Infestation Reports regulations in the Pesticide Use and Application Program;

The awarding of Certificates of Appreciation by the USFS and APHIS to Jan Hacker, Norman Dean, Barry Kesecker, Dave Miller, Arnold Mills, Butch Sayers, Mark Wagoner, and Gary McAninch for their work on the F-1 Sterility and Early Dimilin Projects;

The formation of a Department computer users' group by Dr. Mike Thomas and Ed Murriner;

The completion of a report on mile-a-minute weed, Polygonum perfoliatum, by Bob Williams;

Having the proposed 1987 gypsy moth spray acreage figure given to the Division Director on December 19, which is the earliest the acreage has ever been delineated (this was the first time anywhere near enough staff has been available in the field to adequately address egg mass surveys);

The initiation of efforts to reestablish the Pesticide Advisory Board;

Wrapping up a successful year of cooperative work with West Virginia University on rose rosette disease (RRD) of multiflora rose, that included a summary report on February 19 by Dr. James Amrine, Dale Hindal and Ramsey Frist of WVU;

Initiating a second year of cooperative work on RRD with WVU;

Work by staff on revising old literature and producing new, even though a deteriorating budget situation prevented this material from being produced;

The receipt of a complimentary year-end review of the Pesticide Use and Application Program from EPA;

The successful resolution of the Monroe Elementary School pesticide incident by Pesticides Program personnel, particularly Jim Michnowicz;

The receipt of a complimentary evaluation of the Agricultural Plant Pest Survey & Detection Program from APHIS.

The cooperation and effort of the staff and the USFS that went into preparation of the expanded Cooperative Gypsy Moth Suppression Project Environmental Assessment;

The successful management and completion of the 85,000 acre gypsy moth aerial suppression project;

The resolution of a significant abandoned apiary problem in Jackson County by Apiary Program staff;

The further strengthening of the Agricultural Plant Pest Survey & Detection Program with additional part-time seasonal personnel;

And the excellent progress made by the Reference Insect Collection staff in strengthening the collection as a quality reference tool for insect identification and a regional and national resource.

Division personnel and programs were guided by the Division Work Plan. No major deviations from this plan were experienced. Where minor deviations occurred, and/or projected goals were not reached, they are explained in individual program reports.

Summaries of major Division accomplishments by program for the 1987 fiscal year are as follows:

Agricultural Plant Pest Survey and Detection - Agricultural crops of alfalfa, corn, small grains, soybeans, and tobacco were monitored for endemic plant pests and exotic pests not known to occur in West Virginia or the United States. In addition, surveys were conducted in fruits and forests for certain exotic pests.

Black light traps were operated in six counties in 1986 and eight in 1987 to survey for adult moths and beetles of agricultural importance.

Pheromone (sex attractant) traps for endemic insects were incorporated into the 1987 survey. These traps are host-specific for the pest being monitored and much easier to use in field situations than black light traps.

In the exotic insect trapping program, 50 traps were used in six counties in 1986 and 56 in seven counties in 1987. All traps were negative in 1986 and all have been, so far, in 1987.

The most significant insect problem in field crops this year was the high alfalfa weevil populations that resulted in significant economic losses to first-cutting alfalfa.

The severity of plant diseases, both in the second half of the 1986 growing season and the early part of the 1987 season, were minimal. The most serious diseases in corn were gray leaf spot and northern corn leaf blight. Alfalfa was affected by several leaf spotting fungi, which caused some defoliation as the crop neared harvest.

The evaluation of the gypsy moth inherited sterility egg release project continued with the analysis of approximately 2,500 egg masses from the sterile egg release plot on Short Mountain in Hampshire County and the egg mass sampling of 164 one-fortieth acre subplots.

Cooperative Forest Pest Action - The Gypsy Moth Program continued to account for more hours than all other pest problems combined. Three full-time employees and eight part-time employees worked full-time on conducting egg mass surveys, banding trees, monitoring treatment areas, obtaining information on parasites, and general detection for larvae, pupae or pupal cases and egg masses.

The pheromone trapping program for male moths in 1986 produced catches in 32 counties outside the area considered generally infested in the Eastern Panhandle. The catches in Monroe, Braxton, Jackson, and Cabell were new county records.

The largest gypsy moth aerial suppression project to date was successfully completed in May 1987 with the spraying of 85,000 acres in Jefferson, Berkeley, Morgan, Hampshire, and Mineral Counties. The cost of spray material and aerial contract for the project was $4.24 per acre. An additional 10,000 acres were sprayed in a cooperative project with the U.S. Forest Service, the USDA's Animal & Plant Health Inspection Service and the Uniroyal Chemical Company. The WVDA also cooperated with the West Virginia University Wildlife Division on the study of Dimilin residues on home garden crops.

Aerial flights conducted in June 1987 revealed 14,435 acres of gypsy moth defoliated forest land. This defoliation was broken down by county as follows: Berkeley - 7,415 acres, Hampshire - 3,710 acres, Morgan - 1,840 acres, Jefferson - 850 acres, Mineral - 415 acres, Grant - 130 acres, and Hardy - 75 acres. The defoliation in Grant and Hardy Counties was the first recorded there.

The principal native insects active during the year included: locust leafminer, periodical cicada brood X, yellow poplar weevil, ambrosia beetles, an oak sawfly (Pristiphora sp.), and fall cankerworm.

Hardwood tree diseases of significance included: oak decline, sycamore anthracnose, white oak anthracnose, dogwood anthracnose, and oak wilt. The most serious of these was oak decline.

Coniferous tree diseases of note included: various needlecast diseases in Christmas tree plantings, the most serious of which was caused by the fungus Lophodermium seditiosum, a needlecast fungus in a WESTVACO pitch x loblolly pine plantation and a tip blight (Diplodia pini) and needlecast (Lophodermium sp.) on pitch pine in Pocahontas County.

During the year, a cooperative study was initiated between the forest pathologist and Dr. Mannon Gallegly at West Virginia University to investigate pine mortality in the state. The objective of the study is to determine whether mortality attributed to pine root decline is being caused by Pythiacious fungi.

While assisting with nursery inspection work, the forest pathologist diagnosed a serious problem traceable to, among other things, the root rot fungus Phytophthora cinnamomi, and quarantined 15 rhododendron plants infected with crown gall.

This year, 23,790 acres of land were surveyed for Ribes bushes (the alternate host for white pine blister rust disease) and for diseased pine in the White Pine Blister Rust Program. Suppression activities took place on 1,965 acres with 3,915 Ribes plants destroyed. This program continued on a phasedown schedule that will end in the termination of Ribes suppression activity at the end of the 1987 season.

J. B. McLaughlin Agricultural Library - Currently, the library's holdings include 4,610 books and documents, 715 bound periodical volumes, a large number of unbound periodicals, and 225 boxes of pamphlets and technical papers. There were 216 new books, 365 new pamphlets and about 100 Federal Register sheets processed during the year. Carried over from library reorganization work initiated in 1983, and continued annually since, were 163 books and about 300 pamphlets that were processed early in this report year to complete the reorganization.

Nursery Inspection and Registration - There were 160 nurseries and 478 nursery dealers registered to sell nursery stock in the state this year. Inspections were conducted at 270 nurseries and nursery dealerships, resulting in 670 individual pieces of nursery stock and approximately 4 1/2 acres of field grown nursery stock being quarantined due to infestations of insects or plant diseases.

Four violations of the White Pine Blister Rust Quarantine were discovered, with the prohibited currant and/or gooseberry plants being destroyed.

Federal and interstate regulatory work included 26 inspections for houseplants being moved out-of-state by homeowners and inspection of several hundred thousand vegetable seedlings destined for markets in the southern part of the country.

Twenty-three establishments were found violating the Plant Pest Act by selling nursery stock without the required certificate of registration.

Pest Identification Laboratory (PIL) - Phone calls were down 11% compared to the previous year, from 3,476 to 3,078, while

submitted specimens increased 29%, from 502 to 649. Tabular breakdowns of this year's totals are given in the report proper.

Numerous news releases were prepared this year. Subjects covered included: ticks, bagworms, Japanese beetle, elm leaf beetle, gypsy moth, herbicide hookers, periodical cicada, eastern tent caterpillar, corn earworm pheromone trapping program, yellow poplar weevil, potato leafhoppers, Dutch elm disease, flea beetles, and fireblight.

Since the acquisition of a computer for the WVDA Reference Insect Collection (RIC) at the beginning of the fiscal year, data entry was completed on identified specimens for the Orders Diptera, Lepidoptera, Hemiptera, Homoptera, Neuroptera, and Hymenoptera, as well as a considerable portion of the Coleoptera. As of the end of the fiscal year, 8,982 records, representing 14,672 individual specimens, had been entered into the database. This does not include records for almost 3,000 Tabanidae, which, due to space considerations, were removed from the collection and donated to a major tabanid collection housed in the Florida State Collection of Arthropods.

Significant progress was made on the identification of unidentified specimens in the RIC by the PIL entomologist, with assistance from outside specialists.

Specimen donations to the RIC from outside sources totaled 4,190 insects.

Identification and data recording from Cerambycidae in the West Virginia University Collection has been underway for a publication on the longhorned beetles of West Virginia. A first draft of this proposed publication was completed.

The PIL entomologist completed a manuscript revision of the New World species of Cryptolestes (Coleoptera: Cucujidae). It was accepted for publication by the journal **Insecta Mundi.** Also completed was a manuscript on the identification of larval Cucujidae. It was accepted for publication by **Insecta Mundi.** Since then, the PIL entomologist has been named editor of **Insecta Mundi.**

Pesticide Use and Application Program - During the year, 1,365 certification examinations were administered to 726 persons. Licenses were processed for 184 businesses to apply pesticides. Certifications were processed for 1,202 commercial and certified public applicators and 278 new private applicators or farmers certified to purchase and apply restricted use pesticides.

There were 395 inspections and 205 samples taken in the course of enforcement related work. The majority of the complaint investigations centered around treatments for termites and issuance of reports regarding the inspection of homes for

wood destroying organisms at the time of sale. Enforcement actions taken as a result of investigations totaled 49.

Registration activities resulted in 634 pesticide producing companies registering 6,903 products for sale or distribution in the state. In addition to these normal registrations, two FIFRA Section 18 Emergency Exemption requests and four FIFRA Section 24C Special Local Needs requests were processed.

Changes in the regulations concerning the amounts and type of insurance required for licensed pesticide application businesses were completed.

apiary inspection requests. Top priority is given to all cases involving contagious diseases such as American foulbrood.

The vacant full-time inspector position was filled on November 17, with the addition of New Martinsville resident Stephen A. Conlon to the staff. Since the departure of Bardwell Montgomery in September of 1985, the Program had been maintained by a staff of two. Steve's primary assignment area consists of 22 counties in northern West Virginia. In addition to his apiary inspection responsibilities, he was appointed to serve as a representative of the State Apiary Program on the West Virginia Honey Festival Steering Committee and the West Virginia Direct Marketing Association .

In June, veteran apiary inspector Clyde (Hutch) Hutchinson announced that he will retire at the end of October, 1987. This will again reduce the number of inspectors in the state's Apiary Program to two.

BIOLOGICAL CONTROL PROGRAM

The Biological Control Program is conducted under authority of the Plant Pest Act of 1967, as amended 1972. It is designed to conduct, or assist others (government agencies, universities, individuals, etc.) in conducting important biological control programs primarily against imported pests, in order to reduce reliance on chemical control and maximize implementation of integrated pest management practices.

The objective of applied biological control is to improve the relationship between parasites, predators and pathogens and the pest species so as to maintain the undesirable species at population levels lower than would occur in the absence of these natural enemies. Biological control is probably the oldest known method of insect control and it continues to play an increasing role in the management of agricultural and forest pests.

There are 3 important benefits that can be realized by successful biological control programs. First, biological control is environmentally safe to humans and other nontarget organisms. Second, biological control can be relatively permanent, needing little or no supplemental maintenance. Third, biological control is economical with many programs realizing substantial savings over other means of pest control.

Gypsy Moth Biological Control

Survey for the Occurrence, Abundance and Geographical Range of Gypsy Moth Parasites Presently Found within West Virginia- During the 1987 field season approximately 2500 gypsy moth larvae were collected and held in the Insectary at Inwood for parasite emergence. Collections were made from four permanent monitoring plots on Sleepy Creek Mountain in Berkeley County and a single monitoring plot on Short Mountain in Hampshire County. Larval

collections were made weekly starting with the third instar larvae.

Pupal collections (100 pupae) were made from the Short Mountain block on a single occasion and the pupae held for parasite emergence. Pupal collections were attempted on the Sleepy Creek Mountain plots, but were unsuccessful due to the large amount of virus in the population. Also, a large percentage of the moths had already emerged, which suggested that many parasites had also emerged. More careful monitoring for the timing of the pupal stage will be needed to maximize future pupal collections.

During sampling on Short Mountain, numerous larvae of the moth Dasychira basiflava were collected and held for parasite emergence. Many parasites of D. basiflava were collected and held for identification. Also, a viral epidemic was observed in this particular population. Although this epidemic was not quantified, it appeared to cause substantial mortality.

Parasite and Predator Release and Monitoring - In November, Dr. Richard Reardon of the U.S. Forest Service assisted me in the inspection of four Rogas lymantriae (Hymenoptera: Braconidae) release sites in Berkeley County for evidence of parasite establishment. Three of the sites involved Rogas releases made into target gypsy moth populations during the spring of 1985. The remaining site involved a Rogas release into a target population of Dasychira meridionalis. No evidence of Rogas establishment was found at any of the four release sites.

Plans were formulated for the release of the gypsy moth predator Calasoma sycophanta in West Virginia during the spring and summer of 1987. The beetles were to be released into an expanding and healthy gypsy moth population. Prior to release, the elytra of the beetles were to be individually inscribed with a unique code so the Calasoma could be monitored for dispersal and survivability. Two researchers in New England agreed to locate a suitable Calosoma population from which we could collect large numbers of these beetles. As of this time, no suitable populations have been located and it appears this project will not be completed this year.

Gypsy Moth Spray Project

The assignment of information officer for the gypsy moth spray project was given to the biological control specialist prior to the 1987 spray project. The position is stationed at the airport operations headquarters and the responsibilities are to: timely inform appropriate law enforcement and news agencies on the status of the project, be available to local residents to answer questions concerning the project, pass messages along to spray project personnel, and to inform the Division office of the program's progress. During this year's program, 220 telephone calls were either placed or received at the WVDA spray

headquarters telephone located at the Eastern Panhandle Regional Airport in Martinsburg.

During the Fall of 1986, assistance was given to Arnold Mills in the collection of gypsy moth egg mass density data in Hampshire County. Most of the areas sampled were inaccessible by vehicle and had to be traveled by foot. This sampling took two weeks to complete.

Gypsy Moth Inherited Sterility Egg Release Project

Analysis of approximately 2500 egg masses from the sterile egg release plot in Hampshire County was completed during the past year. This analysis involved either holding the egg masses for hatch this spring and counting the number of hatched larvae versus unhatched eggs, or, prior to hatch, counting the number of embryonated and unembryonated eggs in the mass. The results of this analysis will enable the sterile:feral sex ratio to be determined for first instar larvae, pupae, and adult male moths. The majority of these data were transferred to Tom Odell of the U.S. Forest Service at Hamden, Connecticut for analysis and interpretation.

In early spring of 1987, the suppression crew aided in conducting one-fortieth acre egg mass sampling in the sterile egg release area and a nearby control population. A total of 164 subplots was sampled for this phase of the study. This information indicated that the egg mass density on the study area increased from 15 egg masses per acre before the sterile egg release to approximately 161 egg masses per acre for the year following the sterile egg release.

Plans have been made for the sampling of these one-fortieth acre subplots during the fall of 1987. This should complete the data collection associated with the sterile egg release project on Short Mountain.

Musk and Curled Thistle Biological Control

Due to commitment to gypsy moth related activities, no progress was made concerning this key result area.

Miscellaneous

Assistance was given to USDA-APHIS and Plant Pest Control personnel in conducting this year's early Dimilin trials. These duties included aiding APHIS personnel in the mixing and loading of the pesticide and monitoring the effectiveness of the Loran-C guidance system to align swath widths on the spray blocks.

A new method for testing the number of eggs per egg mass (fecundity) was reviewed during the past year. The data indicate that this may be a valuable tool for estimating gypsy moth egg

density (eggs/acre) for a given area. Egg density estimates were made on several 1987 suppression spray blocks.

The biological control specialist assisted Forestry Division personnel in cruising several woodlots to assess gypsy moth related mortality.

A request was made to the Inwood office by a Bunkerhill resident to inspect his outdoor household articles for gypsy moth life forms prior to his move to a non-quarantined area. The inspection was completed by the biological control specialist and no gypsy moth eggs or pupae were observed. All of the appropriate documentation was forwarded to the appropriate state and federal agency offices.

At the request of Alvy Tustin (USDA-APHIS), the biological control specialist placed and serviced Egyptian cottonworm traps in four greenhouses located in the Eastern Panhandle to detect the presence of this exotic pest.

During the past year, seven phytosanitary inspections were conducted on apples to be exported. No insects or pathogens were observed in any of the shipments, all of the appropriate federal forms were completed in each instance.

COOPERATIVE FOREST PEST ACTION PROGRAM

This program provides for forest insect and disease surveillance and detection or abatement programs all under authority of the Plant Pest Act of 1967, as amended in 1972. The program participates in a formal agreement with the United States Forest Service (USFS) and cooperates with the West Virginia University Plant Pathology Department, the USFS and the Forestry Division of WVDA in conducting surveys, identifying causal agents, delimiting infestations, planning control programs, and assisting citizens of West Virginia in forest insect and disease related problems. The activities of the programs are administered and carried out by the Forest Entomology and Forest Pathology Sections. Primary section programs include Gypsy Moth, White Pine Blister Rust and Oak Wilt.

Entomology Section

During fiscal year 1987, the insect again receiving the most attention was the gypsy moth. Several native insects were abundant and caused moderate defoliation to hardwoods.

The third year of defoliation by gypsy moth in West Virginia was recorded on June 4, 1987. Approximately 14,435 acres of hardwoods were defoliated in Jefferson, Berkeley, Morgan, Hampshire, Mineral, Grant and Hardy Counties. Approximately 8,250 acres were defoliated in 1986 and 2,450 acres in 1985.

gypsy moth infestation has been found as far west as eastern Preston, and northern Tucker and Pendleton Counties.

The egg mass surveys conducted in early and late summer and throughout the fall indicated the need to treat approximately 95,000 acres in the spring of 1987. The areas treated in the spring of 1986 showed an average reduction in gypsy moth egg mass density of better than 90% and none were scheduled for retreatment.

Aerial flights conducted in June 1987 revealed that 14,435 acres of forest land were defoliated. This defoliation was broken down by county as follows: Berkeley - 7,415 acres, Hampshire - 3,710 acres, Morgan - 1,840 acres, Jefferson - 850 acres, Mineral - 415 acres, Grant - 130 acres and Hardy - 75 acres.

Of the 14,435 acres defoliated, 465 were found in treatment blocks and 285 acres of these were attributed to encroachment from the adjoining states of Maryland and Virginia. Approximately 4,940 acres of the total were in the Sleepy Creek Public Hunting and Fishing Area. This area, in concurrence with the Department of Natural Resources, was used as a control, or non-treatment area, for spray trial work.

The remaining acres defoliated were in areas adjacent to treatment blocks, including 1,390 acres close to the Virginia line in the George Washington National Forest, and areas not surveyed due to limitations of staff, time and accessibility.

The defoliation which occurred in Hardy and Grant Counties was the first recorded gypsy moth defoliation in these counties.

Suppression - The treatment plans for gypsy moth began in the early fall of 1986 and approximately 95,000 acres of forest land were selected for treatment in Berkeley, Jefferson, Morgan, Hampshire and Mineral Counties. Adjustments on acreage were made due to limited State money for the cooperative USFS program. The final acreage treated in the cooperative program was 85,000 acres.

The aerial application bid was revised and sent to prospective bidders in ample time for the bids to be processed. However, internal problems arose and the contract was delayed. K & K Aircraft of Bridgewater, Virginia was eventually awarded the contract at a cost of $1.979 per acre.

The actual treatment program began on May 5, when one small Ag-Cat arrived and, after calibration, proceeded to treat areas in and around the Martinsburg Airport. The foliage and larval development in this area was advanced enough, over the other areas slated for treatment, to begin spraying.

Tree mortality was observed in the areas defoliated in 1986. Those areas in the Sleepy Creek Public Hunting and Fishing Area and on Cacapon Mountain and North Mountain experienced the heaviest mortality.

Gypsy Moth

Detection, Abundance and Defoliation Surveys - The gypsy moth project, again this year, accounted for more hours than all other pest problems combined. Three full-time employees and eight part-time employees worked full-time on conducting egg mass surveys, banding trees, monitoring treatment areas, obtaining information on parasites and general detection for larvae, pupae and egg masses.

The trapping program for male moths in 1986-87 was supplemented by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), with a state cooperative funding project for southern West Virginia and a trapping program conducted by APHIS personnel in the northern section of West Virginia. All counties in this cooperative project were trapped on a one-trap/4-square mile-grid. Additional trapping was conducted using the same grid pattern by the WVDA's Plant Pest Control Division in Pocahontas, Pendleton, Greenbrier, Mercer, Summers, and Monroe Counties. The counties of Ritchie, Gilmer, Braxton, Nicholas, Fayette, Kanawha, Clay, Calhoun, Roane, Jackson, Wirt and Wood were trapped in random areas using cooperation from WVDA Forestry Division personnel. Additional traps were placed in the State parks and State forests. The only counties not trapped for gypsy moth were Grant, Hardy, Mineral, Hampshire, Morgan, Berkeley, and Jefferson. These counties are currently infested with varying degrees of infestation by gypsy moth and are monitored using a different method.

The counties having male moth catches in 1986 and the numbers were: Preston - 2,559, Pendleton - 1,692, Tucker-1,116, Monongalia - 539, Barbour - 402, Taylor - 335, Marion-301, Randolph - 265, Harrison -261, Wetzel - 188, Marshall - 147, Hancock - 115, Brooke - 101, Lewis - 82, Ohio - 77, Doddridge-30, Upshur - 23, Greenbrier - 17, Gilmer - 8, Wood - 6, Monroe-5, Webster - 4, Tyler - 4, Pleasants - 4, Ritchie - 4, Putnam-4, Mason - 4, Braxton - 3, Wirt - 3, Mingo - 2, Jackson - 1 and Cabell - 1. The catches in Monroe, Braxton, Jackson and Cabell were new county records.

In addition to this survey, the USFS caught male moths in Greenbrier (1), Pendleton (256), Pocahontas (165), Preston (10), Randolph (21), and Tucker (289) Counties and nine traps at Blackwater State Park caught 88 males in the state park trapping program.

Banding of host trees continued throughout the Eastern Panhandle and in counties adjacent to the infested counties. The

The additional aircraft requested in the bid arrived on May 11 and proceeded to treat the remaining acreage, which was 80,850 acres. The Ag-Cat was released on May 11, after treating 4,150 acres. The treatment continued with one Twin Beech (on May 11 only) and two DC-3's until May 17, 1987 when a total of 85,000 acres were treated in the following counties: Jefferson - 3,300, Berkeley - 12,250, Morgan - 13,800, Hampshire - 28,251 and Mineral - 27,399.

The weather during the operation was excellent with the only delays occurring on days when wind, temperature or other unsuitable conditions existed. The equipment and aircraft supplied by the contractors were in excellent condition and only minor breakdowns occurred.

All areas were treated with 2 ounces of Dimilin 25W, 0.5 ounces (.03 lb.) of active ingredient per acre, in total volume of one gallon of water to the acre.

Additionally, two 5,000-acre blocks were treated with Dimilin in a cooperative study project. The study was designed to evaluate the efficacy of Dimilin when applied to forest trees at first hatch of eggs on southern exposures and before foliage expansion had taken place (first block April 20-22), and at 100% hatch and leaf expansion (second block, May 1-5).

Both blocks were split into two 2,500-acre blocks, one of which was treated with 2 ounces Dimilin 25W formulation and the other with 2 ounces Dimilin 2F formulation. The dose was the same for all treated blocks (.03 lb. AIA) and the two formulations were used only because of availability. The final analysis of this project will be made in late fall when egg mass counts are conducted. The project was a cooperative endeavor between USDA-APHIS, UNIROYAL, WVDA and the USFS.

Field personnel responsible for collecting data were Quentin "Butch" Sayers, Norman Dean, Dave Miller, and part-time personnel Arnold Mills, Mark Wagoner, and Barry Kesecker.

Native Forest Insect Surveys

Forest insect surveys were conducted for various native insects throughout West Virginia. The eastern tent caterpillar, which normally causes great concern with urban dwellers, was practically nonexistent throughout the state. A polyhedrosis virus and tachinid fly are primarily responsible for reducing the population. The populations are expected to increase in the next several years.

The fall webworm, which was abundant in 1984, has subsided and few nests were observed in the high mountain areas. This insect is sporadic and surveys to determine outbreaks are inconsistent.

The locust leafminer continued at low levels in southern WV. However, major infestations were noted in the high mountains and Eastern Panhandle.

The periodical cicada brood IV occurred in southern WV during late May-July 1986. Brood X, the largest brood of cicada in the Northeast, occurred in late May-July 1987 in the counties of Jefferson, Berkeley, Morgan, Hampshire, Mineral, Hardy and the northeastern part of Grant. Limited scattered emergence from this brood also occurs outside its primary population range. In West Virginia, this was principally in the westcentral and southwestern counties.

The yellow poplar weevil caused extensive damage to yellow poplar throughout WV during June-July 1986 and extremely heavy in June-July 1987. The infestations in 1987 were the heaviest recorded.

In 1985-86, ambrosia beetles caused considerable damage to CCA treated lumber, cross ties and rails. As a result, several saw mill operations were forced to treat their log decks and lumber with Ambrocide. In 1986-87, the beetles were reported causing damage to lumber at these same mills, which are again treating for their control.

In July and August of 1986, an oak sawfly, Pristiphora sp., defoliated red oak over several thousand acres of forest land in Barbour and Randolph Counties. Ground observations indicated the insect had been prevalent for several years and mortality to red oaks was occurring.

Surveys for the fall cankerworm were conducted in the counties of Pocahontas, Randolph, Tucker, Greenbrier, Pendleton, Hardy and Grant. The surveys indicated defoliation would occur in Grant County north of the Stoney River Dam. In June, several hundred acres were defoliated along the top of the Allegheny Front from Rt. 50 to Stoney River Dam.

Surveys for the oak leaftier were conducted in the same counties as the fall cankerworm. No areas were found to contain populations of the tier.

Information and Education

Tours and camps were arranged and attended. These were: the National 4-H Forestry Invitational at Jackson's Mill, Conservation Camp, Forest Industries Camp, the Webster County Nature Tour and the Annual Wildflower Pilgrimage at Blackwater Falls State Park.

The Mountain State Forest Festival is attended on an annual basis and a display depicting forest insects and diseases is set up and manned by Program personnel.

Numerous talks and programs were presented throughout the year. They included: radio talks, with WVDA's Doug Hudson on a scheduled basis; radio talks with local stations on various topics; and programs and talks to garden clubs, schools, forestry groups, civic organizations and various committee meetings.

A quarterly newsletter, that provides current information on forest insects and diseases is sent to cooperators and other concerned individuals.

The annual forest insect and disease calendar was prepared and mailed. This calendar depicts forest insects and diseases (in black and white photographs) that occur in West Virginia. The bottom section contains timely information on treatment of various insects and diseases.

Program Administration

The combined Entomology and Pathology Sections employ 10 full-time personnel who work on various programs. Five of these work on the gypsy moth project, one is a forest pathologist who works with forest diseases and four are responsible for white pine blister rust control activities.

Six summer (part-time) employees were hired to assist with the various activities in the Gypsy Moth Program.

A cooperative agreement is completed each year and submitted to the USFS for cooperative funding for the Forest Pest Action Program and the Gypsy Moth Suppression Project. These funds are on a 50/50 matching basis, but the Forest Pest Action program is limited to a maximum of $40,000 from the USFS. Reimbursement claims are submitted on a Federal fiscal year basis (October 1-September 30) or upon completion of the project.

An environmental assessment and a work and safety plan are written each year to satisfy the needs of the USFS when conducting a cooperative suppression project.

Public meetings to address the Gypsy Moth Suppression Project were planned and held March 24 at the Vocational Technical Center at Keyser, March 25 at the Berkeley County Public library in Martinsburg and March 26 at the Capon Bridge Fire Hall. These meetings are designed to address the issues and concerns that landowners may have on a proposed project. Also, the areas slated for treatment were presented to the attendees. No issues or concerns detrimental to the program were voiced. The greatest concern of those attending was making sure they were in a treatment area. If they were not in a treatment area, they desired to know why they were omitted.

A meeting was held with the Cacapon River Commission, at the members' request, to discuss the gypsy moth situation in the Capon Bridge/Yellow Springs area.

A letter giving notification of public meetings and a brief description of the proposed project was prepared and sent to a total of 104 individuals and groups. The letter allowed the person or group a chance to voice any concerns they (it) may have had with the impending 1987 treatment project. All responses received were in favor of the project.

Forest Entomologist and Program Leader Alan R. Miller was named Program Chairman for the 1987 Annual Gypsy Moth Review which will be held at the Marriott in Charleston, WV, December 8-10. Alan is vice-chairman of the National Gypsy Moth Management Board and will serve as chairman in 1988-89.

The program leader continues to serve as Secretary of Conservation Camp, Assistant Director of Forest Industries Camp and Co-chairman (membership) of the Agriculture and Forestry Alumni Association of West Virginia University.

Pathology Section

The primary duties of the forest pathologist are to conduct disease surveys and investigations in hardwood and conifer stands. The surveys are used to detect the presence and severity of native and introduced diseases. Disease epiphytotics may cause growth loss, a reduction in log grade or tree value and tree mortality. Information on disease incidence is helpful when trying to make disease control recommendations or implementing control programs. Work was accomplished as scheduled in each of the major areas of the work plan.

Tree Diseases Surveys and Investigations

Hardwoods - The most serious hardwood disease problem investigated during the fiscal year was oak decline. This problem has been observed throughout much of the state. Investigations regarding oak mortality were conducted in Randolph and Morgan Counties. Scarlet and black oak appear to be the most commonly affected species. However, red oak and white oak occasionally succumb. In nearly every case investigated, the root rot pathogen Armillaria mellea and an insect, the two-lined chestnut borer, were the agents responsible for the mortality. Generally, drought conditions and/or insect defoliation were considered the predisposing agents.

In conjunction with other disease surveys conducted throughout the state, surveys were conducted for foliage diseases of hardwoods. Anthracnose disease of sycamore varied from light to moderate throughout the state. A few individual trees appeared to be nearly totally defoliated while most trees suffered only partial defoliation. White oak anthracnose appeared to be generally light throughout the state. Dogwood anthracnose, Discula sp., was reportedly beginning to cause

extensive damage on mountain tops in the Eastern Panhandle counties.

Oak wilt aerial surveys were conducted over 16 high oak wilt disease incidence quadrangles in the Eastern Panhandle and 20 high disease incidence quadrangles in the southern portion of the state. No trends toward increases or decreases in disease incidence were detected. However, annually, there are fluctuations in disease incidence in each quadrangle.

Conifers - The most serious disease problems detected in Christmas tree plantings were caused by needlecast diseases. The most serious needlecast disease was caused by the fungus Lophodermium seditiosum. Through surveys and inquiries, it was determined that more than a dozen growers throughout the state reported Lophodermium needlecast in their Scotch pine plantings.

At the request of WESTVACO forester Jim Bridgen, investigations regarding a needle disease problem were conducted at a pitch x loblolly hybrid plantation near Duo, Greenbrier County. The asexual stage (Leptostroma) of a needlecast fungus was found fruiting on the needles. Speculation is that the sexual stage is a Lophodermium sp. According to the USFS, this is a first report in the United States of a Lophodermium needlecast on pitch x loblolly pine.

In Pocahontas County, a survey was conducted to determine the cause for decline and mortality of pitch pine. Examination of trees at a number of locations revealed that two fungi appeared to be responsible for the observed problems. The tip blight fungus, Diplodia pini, was observed fruiting on dead needles on the ends of the branches while the needlecast fungus, Lophodermium sp., was fruiting on the two-and three-year-old needles on many branches. Apparently, stress caused by the death of the new growth and casting of older needles was killing the trees.

An unusual needlecast disease problem in West Virginia is Meloderma needlecast, Meloderma desmazierii. This unusual disease was first discovered in West Virginia during November of 1985. It proved to be so uncommon that Dr. William Merrill, a noted pathologist at Penn State University, made a special trip in May of 1987, to view the disease in a Braxton County Christmas tree plantation.

Other needlecast diseases of interest include Rhizosphaera, Swiss and Bifusella. Rhizosphaera needlecast, Rhizosphaera kalkhoffii, appears to be increasing in Norway and Colorado blue spruce plantings. Swiss needlecast, Phaeocryptopus gaumanii, was detected in only one Douglas-fir plantation during the fiscal year. On white pines growing in the understory of forest stands in Mercer and Summers Counties, Bifusella needlecast, Bifusella linearis, was found to be quite a problem.

control zone land. The National Forest Control Zone encompasses 124,610 acres with white pine on 70,591 acres.

J. B. McLAUGHLIN AGRICULTURAL LIBRARY

The J. B. McLaughlin Agricultural Library is a literature and literature services resource center that supports the work of the Department's professional staff. It provides an organized retrievable setting for the reference literature that is indispensable to staff activities. The responsibility for maintaining and supervising the library was delegated to the Plant Pest Control Division in 1981. It is staffed by a retired librarian on a part-time basis, who receives support from an inter-divisional library committee, chaired by the Plant Pest Control Division member. It is listed in the West Virginia Union List of Serials, the West Virginia Blue Book, the American Library Directory and the Union List of Books of West Virginia, which was discontinued in 1982, but is still good for listings of books before 1982. These listings make its resources available on a nationwide basis. Outside requests for literature and use are received from State colleges and universities, other State agencies and the general public and occasional requests for literature are received from outside the state.

Currently, the library's holdings include 4,610 books and documents, 715 bound periodical volumes, a large number of unbound periodicals and 225 boxes of pamphlets and technical papers.

Organization

There were 163 books and about 300 pamphlets remaining to be cataloged and indexed, respectively, from FY-86 to complete the library's reorganization. Processing of these was completed in the first quarter of this report year.

Surplus journal material, which could not be sold due to the practice of microfilming by libraries, was donated to the Exchange and Gift Division of the State Library Commission to help support a request for material for shipment to Nigeria.

Maintenance

Principal maintenance activities during the year included: updating and putting the commercial catalog file in good order, checking the 1987 journal subscriptions closely to avoid the problems with continuity that have occurred in the past, conducting an internal review of subscription costs of publications (this was not cross-checked with the Fiscal Division), preparation and handling of the annual journal binding order, processing journals and routing them and other publications of interest through circulation channels, cataloging 216 books, and indexing 365 pamphlets and about 100 Federal Register sheets, the latter on various chemicals.